We Claim:

1. An illumination device, comprising:

a plurality of LED dies to generate optical radiation;

an interconnect circuit layer to provide electrical connection for the plurality of LED dies;

a plurality of optical waveguides, wherein each of the plurality of optical waveguides includes a first end and a second end, wherein each first end is in optical communication with a corresponding LED die of the plurality of LED dies; and

an array of optical elements, wherein each optical element of the array of optical elements is interposed between a corresponding first end of the optical waveguide and the corresponding LED die.

2. The illumination device according to claim 1, wherein the array of optical waveguides comprises a plurality of optical fibers.

3. The illumination device according to claim 2, wherein the plurality of optical fibers comprises a plurality of polymer clad silica fibers, each having a core diameter of about 400 to about 1000 micrometers.

4. The illumination device according to claim 2, wherein the second ends of the plurality of fibers are bundled to form a single light illumination source.

5. The illumination device according to claim 2, wherein the second ends of the plurality of fibers are bundled into separate groups to form separate light illumination sources.

6. The illumination device according to claim 1, wherein the array of optical elements comprises an array of passive optical elements.

7. The illumination device according to claim 6, wherein the array of passive optical elements comprises an array of optical concentrating elements.

8. The illumination device according to claim 1, further comprising:

a projecting element to receive and project optical radiation emanating from the second ends of the plurality of optical waveguides.

9. The illumination device according to claim 1, wherein the plurality of optical waveguides comprise a plurality of optical fibers, further comprising:

a plurality of optical focusing elements to receive and focus optical radiation emanating from the second ends of the optical fibers.

10. The illumination device according to claim 9, wherein the optical focusing elements comprise fiber lenses, wherein each second end comprises a corresponding fiber lens.

11. The illumination device according to claim 1, wherein each of the first ends comprises a corresponding fiber lens.

12. The illumination device according to claim 1, further comprising a waveguide connector to support each of the first ends of the plurality of waveguides.

13. The illumination device according to claim 1, wherein the array of optical elements comprises an array of reflectors.

14. The illumination device according to claim 13, wherein the array of reflectors comprises an array of reflectors formed in multilayer optical film.

15. The illumination device according to claim 13, wherein the array of reflectors comprises an array of open-cavity metallized reflectors.

16. The illumination device according to claim 13, wherein each reflector receives at least a portion of the light emitted by a corresponding LED die at an incident angle of about 0.7 degrees to about 25.7 degrees relative to the normal from the LED die top surface.

17. The illumination device according to claim 13, wherein the LED dies are disposed proximate to a first surface of said array of reflectors such that light emanating at angles up to 80 degrees as defined relative to a line normal to an emission surface of the LED dies is reflected by the array of reflectors.

18. The illumination device according to claim 13, wherein the array of reflectors are disposed relative to the LED dies and the first ends of the optical waveguides to substantially preserve an étendue of each of the plurality of LED dies.

19. The illumination device according to claim 1, wherein the interconnect circuit layer is disposed on a thermally conductive and electrically insulating substrate.

20. The illumination device according to claim 1, wherein each LED die has a width and wherein each LED die is disposed on the interconnect circuit layer at a distance greater than its width from all neighboring LED dies.

21. The illumination device according to claim 1, wherein each LED die is optically coupled into a different one of the plurality of waveguides.

22. The illumination device according to claim 1, wherein each LED die has a width and wherein each LED die is disposed on the interconnect circuit layer at a distance greater than its width from all neighboring LED dies.

23. The illumination device according to claim 1, wherein each LED die is surface mounted on the interconnect circuit layer.

24. The illumination device according to claim 1, wherein the interconnect circuit layer comprises a flexible material.

25. The illumination device according to claim 1, wherein the interconnect circuit layer has a thickness of from about 25 μm to about 50 μm.

26. The illumination device according to claim 1, wherein the interconnect circuit layer includes a cantilevered lead adaptable for one of wire bonding and ultrasonic bonding.

27. The illumination device according to claim 1, wherein the plurality of optical elements comprises an array of reflectors, and wherein the LED dies and the array of reflectors are encapsulated.

28. The illumination device according to claim 1, wherein a surface of at least one LED die is coated with a phosphor layer.

29. The illumination device according to claim 28, wherein the phosphor layer is deposited directly onto an emission surface of the at least one LED die in an amount sufficient to convert the output wavelength of the at least one LED die and to substantially maintain an étendue of the at least one LED die.

30. The illumination device according to claim 29, wherein the phosphor layer is precisely defined in size to match an emitting surface of the corresponding LED die.

31. The illumination device according to claim 30, wherein the phosphor layer further comprises tapered portions.

32. The illumination device according to claim 28, further comprising a wire bond coupling the LED die to the interconnect layer, wherein the phosphor layer adheres the wirebond to the LED die.

33. The illumination device according to claim 1, wherein the array of optical elements comprises an array of reflectors, and further comprising a phosphor layer coated on at least a portion of a sheet, said sheet disposed on one of a top surface and a bottom surface of the array of reflectors.

34. The illumination device according to claim 33, wherein the phosphor layer sheet comprises a sheet of selectively patterned phosphor regions, wherein each phosphor region is positioned to cover an emission entrance region of each reflector.

35. The illumination device according to claim 1, wherein a phosphor layer is laminated on one of the top surface and the bottom surface of the array of optical elements.

36. The illumination device according to claim 1, wherein each LED die is disposed in a recessed aperture of the interconnect circuit layer.

37. The illumination device according to claim 1, wherein the array of optical elements comprises an array of reflectors, wherein each reflector of said array has an entrance aperture and an exit aperture, and wherein an emission surface of each LED die is spaced below said entrance aperture.

38. A vehicular headlight comprising the illumination device according to claim 1.

39. An illumination device, comprising:

a first plurality of radiation generating sources to generate optical radiation;

a first plurality of optical waveguides, wherein each of the plurality of optical waveguides includes a first end and a second end, wherein each first end is in optical communication with a corresponding radiation generating source of the first plurality of radiation generating sources;

a second plurality of radiation generating sources;

a second plurality of optical waveguides, each having first and second ends wherein each first end is in optical communication with a corresponding radiation generating source of the second plurality of radiation generating sources; and

an array of optical elements, wherein each optical element of the array of optical elements is interposed between a corresponding first end of the first and second pluralities of optical waveguides and the corresponding radiation generating source.

40. The illumination device according to claim 39, wherein the first plurality and second plurality of waveguides comprise a first plurality and a second plurality of optical fibers, wherein the second ends of the second plurality of optical fibers are bundled with the second ends of the first plurality of optical fibers to form a single light illumination source when illuminated.

41. The illumination device according to claim 39, wherein the first and second pluralities of radiation generating sources have different emission spectra.

42. The illumination device according to claim 41, wherein the first plurality of radiation generating sources emits white light.

43. The illumination device according to claim 39, wherein the first plurality and second plurality of waveguides comprise a first plurality and a second plurality of optical fibers, wherein the second ends of the second plurality of optical fibers are bundled in a first bundle and wherein the second ends of the first plurality of optical fibers are bundled in a second bundle, and wherein a first direction of output emission from the first bundle is different from a second direction of output emission from the second bundle.

44. The illumination device according to claim 39, further comprising:

a third plurality of radiation generating sources, and

a third plurality of optical waveguides, each having first and second ends wherein each first end is in optical communication with a radiation generating source of the third plurality of radiation generating sources.

45. The illumination device according to claim 44, wherein the first plurality of radiation generating sources comprises red emitting LED dies, wherein the second plurality of radiation generating sources comprises blue emitting LED dies, and wherein the third plurality of radiation generating sources comprises green emitting LED dies.

46. The illumination device according to claim 45, wherein the first, second, and third pluralities of LED dies respectively emit red, blue, and green radiation in concert to generate a variety of colored light.

47. The illumination device according to claim 45, wherein the first, second, and third pluralities of LED dies emit red, blue, and green radiation in concert to generate white light.

48. The illumination device according to claim 39, wherein the second plurality of radiation generating sources emits infrared radiation.

49. The illumination device according to claim 39, further comprising:

at least one first output optical element to direct output radiation from the second ends of the first plurality of optical waveguides along a first path; and

at least one second output optical element to direct output radiation from the second ends of the second plurality of optical waveguides along a second path.

50. A vehicular illumination system comprising the illumination device according to claim 39, wherein the first plurality of radiation generating sources is illuminatable for a low beam illumination.

51. The vehicular illumination system according to claim 51, wherein both the first and the second plurality of radiation generating sources are illuminated for a high beam illumination.

52. A vehicular illumination system comprising the illumination device according to claim 48, further comprising at least one of an infrared sensor and an infrared communications transceiver.

53. An illumination device, comprising:

a plurality of solid state radiation sources to generate optical radiation;

a plurality of optical fibers, wherein each of the plurality of optical fibers includes a first end and a second end, wherein each first end is in optical communication with a corresponding solid state radiation source of the plurality of solid state radiation sources; and

a plurality of non-refractive optical elements, wherein each optical element of the plurality of optical elements is interposed between a corresponding first end and the corresponding solid state radiation source, and wherein each non-refractive optical element is shaped to reflect concentrated light emitted by a corresponding solid state radiation source into a corresponding optical fiber.

54. The illumination device according to claim 53, wherein the plurality of solid state radiation sources comprise at least one of an array of vertical cavity surface emitting lasers and an array of LED dies.

55. A high density solid state light source, comprising:

a substrate;

an array of LED dies to generate radiation, said array thermally coupled to the substrate;

a patterned interconnect circuit layer to provide electrical connection for the array of LED dies, said patterning corresponding to said array;

a first patterned adhesive layer to attach the interconnect layer to the substrate, said patterning corresponding to said array;

an array of reflective optical elements formed in a sheeting to collect radiation emanating from the array of LED dies; and

a second patterned adhesive layer to attach the sheeting to the interconnect layer.

56. The high density solid state light source according to claim 55, further comprising:

a layer of patterned phosphor bonded to a surface of the sheeting, said patterning corresponding to said array.

57. The high density solid state light source according to claim 56, wherein the surface is a bottom surface of the microreplicated sheeting closest to the LED die array.

58. The high density solid state light source according to claim 55, wherein the patterned interconnect circuit layer comprises a patterned flexible interconnect circuit layer.

59. The high density solid state light source according to claim 55, further comprising: a first layer of phosphor disposed proximate to a first LED die and a second layer of phosphor disposed proximate to a second LED die, wherein the second phosphor comprises a material composition different from a material composition of the first layer of phosphor.

60. The high density solid state light source according to claim 59, wherein an output emission from the array of LED dies produce white light at a selected color temperature.